

# VEGETATION in AREAS STRIPMINED for PHOSPHATE

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By 1974 there were almost 250,000 acres of land in Florida that were disturbed by surface mining, and this had increased to 332,000 acres by 1977. During the same period acres of mined land reclaimed also increased from 32,000 to 45,000 acres. Most of the land was stripmined for phosphate in Polk, Hillsborough, and Hamilton counties. By 1977, 181,000 acres had been mined for this purpose.

Reclamation of surface mines is of interest to environmentalists, conservationists, developers, and ultimately, every citizen who enjoys the products that result from mining activities. Establishment of vegetation is often very difficult due to undesirable soil conditions. This problem is recognized by the U.S. Department of Agriculture, Soil Conservation Service (SCS). The SCS's Long Range Plant Materials Program for Florida gives the highest priority to the solution of this problem. One of the initial efforts has been to make a field study of native and naturalized plants that occur on stripmined land. The study was started in 1976 and completed in 1978 at locations throughout Florida. This paper concerns only that portion of the state that pertains to areas stripmined for phosphate. The results are applicable only to overburden and not to sand tailings.

All of the major areas stripmined for phosphate in Florida were visited, and 20 sites were selected for detailed

study.

Data obtained at each site were: kind of mining, age and type of spoil, soil conditions, topographic features, existing erosion, plants occurring, erosion control effectiveness, plant vigor, and management treatments. The data were processed, stored, retrieved, and analyzed to determine plant succession and related factors important in revegetating land mined for phosphate.

Of eight tree species that were noted, live oak (*Quercus virginiana* Mill), and water oak (*Quercus nigra* L.) were the most important.

Of six shrubs that were noted, eastern baccharis (*Baccharis halimifolia* L.), wax myrtle (*Myrica cerifera* L.), and lantana (*Lantana camara* L.) were most prevalent.

Of four vines, the most commonly found were greenbriar (*Smilax* spp. L.) and Muscadine grape (*Vitis rotundifolia* Michaux). These vines are effective for erosion control.

Of ten grasses, the four most commonly found were natalgrass (*Rhynchelytrum roseum* Nees, Stapf and Hubb), bushybeard bluestem (*Andropogon glomeratus* Chapm.) common bermuda grass (*Cynodon dactylon* L. Pers.), and smutgrass (*Sporobolus poiretii*) (Roem. and Schult.) Hitchc.

Seventeen herbaceous plants occurred but most of them are annuals and have upright growth habits that limit their effectiveness for permanent erosion control and revegetation. Seed of several of the herbaceous plants are available

commercially. These plants are: hairy indigo (*Indigofera hirsuta* L.), jointvetch (*Aeschynomene americana* L.), and alyce clover (*Alysicarpus vaginalis* L., D.C.)

Plant succession is an important factor in determining the type of plants, i.e., trees, shrubs, vines, grasses, and herbaceous plants, to be utilized for revegetation. This study of stripmined land from 2 to 80 years old afforded a unique opportunity to study plant succession on phosphate soil. Only frequently occurring plants are used to show the following plant succession stages.

The first and most important plants to become established during the first 5 years are herbs and grasses. The herbaceous plants are dog fennel (*Eupatorium capillifolium* Lam. Small), hairy indigo, Caesar weed (*Urena lobata* L.), and jointvetch. The grasses are natalgrass, bushybeard broomsedge, and common bermudagrass. The two shrubs, eastern baccharis and lantana, became established within the first 5 years.

After the spoil is several decades old, the pioneer plants are joined by significant amounts of other herbs and grasses. Woody plants also become more common, with eastern baccharis, live oak, lantana, wax myrtle, and muscadine grape being the most dominant.

After 50 years, live oak, water oak, eastern baccharis, wax myrtle, lantana, guava (*Psidium guajava* Raddi), saw palmetto (*Serenoa repens* Bartr. Small), and various vines become the dominant plants.

## ENDANGERED SPECIES

The U.S. Fish and Wildlife Service recently determined seven plants of central Florida to be endangered or threatened species as pursuant to the Endangered Species Act of 1973, as amended.

The seven plant species are:

*Chionanthus pygmaeus* (pygmy fringe tree), a shrub, is known from central Lake, northwestern Osceola, Polk, and Highlands counties, and

may be present in Citrus County. Endangered.

*Erygium cuneifolium* (snakeroot), a perennial herb, from Highlands County, with outlying populations reported from Putnam and Collier counties. Endangered.

*Hypericum cumulicola* (Highlands scrub hypericum), a perennial herb, from Polk and Highlands counties. Endangered.

*Paronychia chartacea* (papery whitlow-wort), an annual herb, from

Lake, Orange, Polk, and Highlands counties. Threatened.

*Polygonella basiramia* (a wireweed), an annual herb, from Polk and Highlands counties. Endangered.

*Prunus geniculata* (scrub plum), a shrub, from Polk and Highlands counties. Endangered.

*Warea carteri* (Carter's mustard), an annual herb, from Highlands County. Endangered.